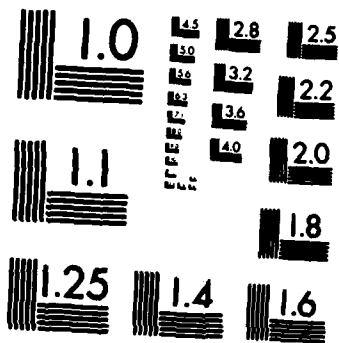


AD-A172 090 PARTIAL SUPPORT OF BOARD ON ATMOSPHERIC SCIENCES AND
CLIMATE(U) NATIONAL ACADEMY OF SCIENCES-NATIONAL
RESEARCH COUNCIL WASHINGTON DC J 5 PERRY 18 APR 86
UNCLASSIFIED AFOSR-TR-86-0708 AFOSR-84-0062 F/G 4/2

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DTIC REPORT DOCUMENTATION PAGE				
1a. REPORT SECURITY CLASSIFICATION SELECTED		1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY SEP 19 1986		3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for Public Release Distribution unlimited		
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE		5. MONITORING ORGANIZATION REPORT NUMBER(S) AFOSR-TR- 86-0708		
4. PERFORMING ORGANIZATION REPORT NUMBER ☆		7a. NAME OF MONITORING ORGANIZATION AFOSR/NC		
6a. NAME OF PERFORMING ORGANIZATION National Academy of Sciences		7b. ADDRESS (City, State and ZIP Code) Bldg 410 Bolling AFB DC 20332-6448		
6b. OFFICE SYMBOL (If applicable)		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER AFOSR-84-0062		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION AFOSR		10. SOURCE OF FUNDING NOS.		
8b. OFFICE SYMBOL (If applicable) NC		PROGRAM ELEMENT NO. 61102F	PROJECT NO. 2310	TASK NO. A1
8c. ADDRESS (City, State and ZIP Code) Bldg 410 Bolling AFB DC 20332-6448		WORK UNIT NO.		
11. TITLE (Include Security Classification) Partial Support of Board on Atmospheric Sciences and Climate				
12. PERSONAL AUTHOR(S) John S. Perry				
13a. TYPE OF REPORT FINAL	13b. TIME COVERED FROM 1 Dec 84 TO 30 Nov 85	14. DATE OF REPORT (Yr., Mo., Day) 18 April 86	15. PAGE COUNT 6	
16. SUPPLEMENTARY NOTATION				
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB. GR.	climate, solar-terrestrial, atmospheric	
19. ABSTRACT (Continue on reverse if necessary and identify by block number)				
<p>This report summarizes the results of a series of meetings during the period 1 April 1984 to 1 May 1985 of the Board on Atmospheric Sciences and Climate of the Commission in Physical Sciences, Mathematics, and Resources of the National Research Council. The scientific and Technical objectives of this Board include: review in broad perspective of both basic and applied research dealing with the atmosphere and the solar-terrestrial system, and with the physical systems influencing weather and climate; provision of advice and</p>				
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS <input type="checkbox"/>			21. ABSTRACT SECURITY CLASSIFICATION	
22a. NAME OF RESPONSIBLE INDIVIDUAL Francis J. Wodarczyk			22b. TELEPHONE NUMBER (Include Area Code) 767-4963	22c. OFFICE SYMBOL NC

guidance to appropriate government agencies on problems and programs within the Board's interest and expertise; and fostering the application of scientific knowledge of the atmosphere, climate, and social/economic systems to make wise use of atmospheric and climatic resources for the benefit of our country and other nations. FINAL REPORT, AFOSR-84-0062, Partial Support of Board on Atmospheric Sciences and Climate.

INTRODUCTION

The scientific and technical objectives of the Board on Atmospheric Sciences and Climate (BASC) of the Commission on Physical Sciences, Mathematics, and Resources are very broad and include the following: *were:*

- (1) Review in broad perspective both basic and applied research dealing with the atmosphere and the solar-terrestrial system, and with the physical systems influencing weather and climate.
- (2) Provide advice and guidance to appropriate government agencies on problems and programs within the Board's interest and expertise, including as examples:
 - Objectives, priorities, plans, and implementation strategies for the National Climate Program.
 - U.S. participation in international research and application programs relating to the atmosphere and climate such as the Global Atmospheric Research Program and the World Climate Program, *and*
 - Scientific objectives, priorities, and plans for focused national programs in critical areas of atmospheric science and climate research such as atmospheric chemistry, mesoscale research, weather modification, human impacts on climate, aeronomy, and solar-terrestrial research.
- (3) Foster the application of scientific knowledge of the atmosphere, climate, and social/economic systems to make wise use of atmospheric and climatic resources for the benefit of our country and other nations. *←*

The Board executes its responsibilities both through its own activities and through the work of specialized committees and panels formed to address delimited problem areas.

SUMMARY OF ACTIVITIES

This summary of activities covers the period April 1, 1984 to May 1, 1985 with an outlook through October 31, 1985, the end of the current contract period.

Board on Atmospheric Sciences and Climate (BASC)

BASC met October 24-25, 1984 and April 17-18, 1985. It is scheduled to meet again during the fall of 1985.

At its October 24-25, 1984 meeting, considerable attention was directed to the coordination of atmospheric sciences research. This subject had been motivated by concerns about priorities in the atmospheric sciences and the fact that many new and expensive research initiatives had been proposed in recent years in climate, atmospheric sciences and solar-terrestrial research. Among the large programs reviewed at this meeting were the Tropical Ocean/Global Atmosphere (TOGA) Program, the World Ocean Circulation Experiment (WOCE), the International Satellite Cloud Climatology Project (ISCCP), STORM,

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Global Tropospheric Chemistry, the National Solar-Terrestrial Research Program, various satellite programs, and the important area of research infrastructure, i.e., computers, aircraft, etc.

During its April 17-18, 1985 meeting, BASC continued the discussion initiated during the October 1984 meeting and made tentative plans for an indepth study of this subject over the next few years. Three scientific areas were discussed: geophysical turbulence, radiation and physical processes, and laboratory research in cloud physics.

Climate Research Committee (CRC)

CRC has continued an extremely active program. At its tenth session on June 18-19, 1984, a one-half day session was devoted to the relation of the monsoon to TOGA. Discussion centered around the interannual variability of the El Nino, Southern Oscillation and monsoons, the origin of the Southern Oscillation, and the intraseasonal variability. At its eleventh session on November 29-30, 1984, the CRC reviewed the progress of various national and international climate research programs and conducted a half-day study session to review recent results in modeling studies of climatic sensitivity to increased carbon dioxide. The first day of its twelfth session on March 20-21, 1985 was devoted to the National Climate Research Program. Representatives of NOAA, NSF, and NASA gave detailed briefings on their program, and the Committee formulated plans for climate program reviews. Members were requested to submit by early May written reports on past successes of and future possibilities for the National Climate Research Program as input to the NCPO workshop in July 1985. Motivated by concern for the funding expectations of TOPEX, the CRC recommended that a joint BOSC/CRC letter be drafted and sent to NASA. A meeting of CRC has been scheduled for September 5-6, 1985. A discussion of climatic change and global temperature trends will be highlighted.

Tropical Ocean/Global Atmosphere (TOGA) Advisory Panel. The TOGA Advisory Panel of the CRC met April 18-19, 1984; August 20-21, 1984; January 3-4, 1985; May 16-17, 1985; and is scheduled to meet again during September 1985. Several subpanel meetings have also been held. Individual panel members have also participated in the September 1984 and the April 1985 meetings of the TOGA International Scientific Steering Group. Much attention has been given to the scope and plans for TOGA, both nationally and internationally, and the Panel has advised the TOGA Project Office with reference to specific segments of its FY 1985 operating plan. At present the Panel is finalizing a brief document on TOGA research strategy which will be published late this summer.

Advisory Panel for the International Satellite Cloud Climatology Project (ISCCP). This Panel, which operates under the aegis of the Climate Research Committee, was established to advise on the international ISCCP and the U.S. First ISCCP Regional Experiment (FIRE) program, to assist with the planning of these programs, and to disseminate information through such mechanisms as workshops. The first meeting of the ISCCP Panel occurred on May 21, 1984. During the session, discussions centered on the status of ISCCP operations, the ISCCP cloud algorithm, U.S. activities for ISCCP, the status of FIRE, and



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intercomparison of radiative transfer codes in climate models. The Panel is expected to meet in the summer of 1985 to review the implementation plan for FIRE and the algorithm evaluation plan of ISCCP. The date of the meeting will be determined when draft plans have been completed.

Panel on Mesoscale Research

Under the supervision of BASC, a Panel on Mesoscale Research has been formed to review research and operational activities relating to mesoscale atmospheric systems, assess their effectiveness in furthering understanding of these systems and practical application of this knowledge, and provide scientific guidance to the federal agencies on the planning and implementation of research programs and operational services relating to mesoscale atmospheric systems. The first meeting of this Panel was held July 12-13, 1984. The Panel heard presentations on recent boundary layer experiments, on an airborne investigation of mesoscale convective systems, on recent developments in the Prototype Observing and Forecast System (PROFS) program, on the status of radar atmospheric profilers, on NASA's mesoscale meteorological programs, on the proposed plans for the Genesis of Atlantic Lows Experiment (GALE), and on the status of STORM-Central planning.

Because of its complexity and large cost, the STORM-Central project was the Panel's major topic of discussion. The STORM-Central Plan had been subjected to independent scientific review by an ad hoc panel of BASC, and the Panel strongly agreed with the positive conclusions reached. The Panel recommended that a number of working groups be established soon to refine the concepts and implement the steps needed to ensure the success of STORM-Central, and urged that more research be conducted before STORM-Central in two specific areas--observing system simulation experiments (OSSE) and development of techniques for analysis of four-dimensional data sets. Also, the need and opportunities for "small science," both theoretical and observational, in mesoscale research was recognized.

The second meeting of this Panel was held February 6-7, 1985. The topics covered at this meeting included the status of the Preliminary Regional Experiment for STORM (PRE STORM), Hailswath II, GALE, research requirements and opportunities for mesoscale models, meso-alpha scale modeling activities in the United States, mesoscale modeling and four-dimensional data assimilation, mesoscale atmospheric chemistry, instrument development, and STORM-Central.

Panel on Climate-Related Data

The Panel on Climate-Related Data is concerned with the national system (including federal, state, and regional components) for acquiring, archiving, and disseminating climate-related data. Its second meeting was held July 25-27, 1984 at the National Climatic Data Center, Asheville, North Carolina, to conduct an indepth study of data processing activities. The third meeting of the Panel was held at Champaign-Urbana, Illinois, November 1-2, 1984 to review a typical regional climatic data center. Panel members gathered information about private sector meteorological services at

the January 1985 annual meeting of the American Meteorological Society in Los Angeles. The Panel met on March 28-29, 1985 at the World Weather Building, Camp Springs, Maryland, to review the Climate Analysis Center activities, discuss satellite data problems, and continue development of its report. It is anticipated that study conclusions will be presented at the July 1985 Woods Hole workshop on the National Climate Program. The draft report is expected to be completed late this year, after a final meeting in the fall.

Woods Hole Workshop

At the request of the National Climate Program Office (NCPO), a workshop is planned for July 15-19, 1985 to review the progress and plans of the National Climate Program. Specifically, the workshop is designed to produce suggestions that NCPO might consider in developing a comprehensive five-year plan for the period 1986-1990. A two-phased workshop is planned. Approximately 60 scientists, legislators, and government leaders have been invited for a two-day session, July 15-16, to participate in discussions on climate-related policy issues, the role of climate and weather information in U.S. industry and trade, climate impact assessment, climate-related data and service problems, and climate research and prediction efforts. A small group of the participants will remain, July 17-19, to prepare material for a report that will present specific recommendations for implementation of climate-related programs during the remainder of this decade.

Other Activities

The Board's staff remained active in national and international affairs. In the spring of 1984, the Board's Staff Director assisted in the preparation for and served on the delegation at the Tenth WMO Congress. Likewise in June 1985, he is assisting in the preparation for and will attend the meeting of the WMO Executive Council and the International Conference on the Results of the Global Weather Experiment.

The Board is also responsible for a number of additional studies that have been funded under separate contracts with other federal agencies. These currently include:

1. A Panel on Global Tropospheric Chemistry, under NSF and NASA funding, has finalized a major report, Global Tropospheric Chemistry: A Plan for Action, which was released in October 1984. The report includes recommendations for intensive field, laboratory, and modeling investigations in four areas: biological sources for tropospheric constituents, global distribution and long-range transport of trace species, fast photochemical cycles and transformations, and wet and dry removal processes. Institutional and platform development requirements are assessed, and the need for strong international cooperation is stressed.
2. The U.S. Committee for the Global Atmospheric Research Program (USC-GARP), funded by NSF, NOAA and NASA, conducts most of its activities through

standing panels: the FGGE Advisory Panel, the MONEX Panel, and the Mountain Subprogram Panel.

The FGGE Workshop Organizing Committee of the FGGE Advisory Panel conducted a highly successful FGGE workshop at the NAS Study Center in Woods Hole, Massachusetts, from July 9 to 20, 1984. Over 60 scientists participated in making presentations and preparing a preliminary report of the workshop. Two separate publications will result--one containing the papers presented at the workshop, the other containing the summary and recommendations. The FGGE Workshop Organizing Committee met in Tallahassee, Florida, October 6-7, 1984 to prepare the summary report. The reports are being edited with the assistance of Panel members and should be ready for distribution in June 1985.

The MONEX Panel held a MONEX Boundary Layer Workshop at the University of Wisconsin, Madison, Wisconsin, May 21-24, 1984. The four-day workshop attended by some 20 scientists had sessions on vertical processes, large-scale processes, and low-level monsoon flow. An informal report of the workshop was issued and distributed.

The Mountain Subprogram Panel has organized an ALPEX workshop for May 28-30, 1985 at Yale University, New Haven, Connecticut. The Panel will also hold a meeting during the workshop period. This Panel is being disbanded and reformed as the Alpine Experiment (ALPEX) Panel since ALPEX was the last GARP field experiment.

Six issues of the Global Weather Experiment Newsletter and two issues of the ALPEX Newsletter were distributed during this period.

3. The Committee on Solar-Terrestrial Research (CSTR), funded by NSF, NOAA, NASA, and DOD, operates under the general aegis of BASC and is staffed by a part-time Interagency Personnel Act Assignee. It is proposed to include the funding for this Committee under this proposal for the next budget period. CSTR meetings were held May 23-24, 1984, October 17-18, 1984, January 28-29, 1985, and April 25-26, 1985. At the May 23-24, 1984 meeting, the Committee discussed how best to implement the National Solar-Terrestrial Research Program and the upcoming briefing (May 25, 1984) with the President's Science Advisor. At the October 17-18 meeting, the science of solar-terrestrial research, its present state, and means to advance our understanding within the framework of the National Solar-Terrestrial Research Program were discussed with senior agency representatives. At the January 28-29 meeting, the principal purpose was to review the President's FY 1986 budget for its impact on solar-terrestrial research and the implications for FY 1987. At the April 25-26 meeting, the federal budget situation for solar-terrestrial research and the implications for the National Solar-Terrestrial Research Program was discussed. Senior representatives of NASA, NOAA, and NSF spoke to the Committee.

During this budget period, the CSTR report, National Solar-Terrestrial Research Program, was published.

CSTR has one active panel, the Middle Atmosphere Program (MAP) Panel. The MAP Panel met April 9-10, 1985 and discussed the 1984 report of the previous MAP Panel, Research Recommendations for Increased U.S. Participation in the Middle Atmosphere Program (MAP). Detailed technical presentations on their particular research interests were given by each member, and discussions were begun on the next step in advancing MAP in the United States.

4. A Global Habitability Assessment Panel, funded by NASA, was formed during June 1984. This Panel is carrying out a review and scientific assessment of the concepts, goals, objectives, and preliminary program definition of the NASA Global Habitability effort. Close coordination is being maintained with the proposed International Geosphere-Biosphere Program. A no-cost extension has been requested for the period April 1, 1985 through July 31, 1985.

In addition, the Board's staff provided support for the following activities:

1. The Committee on the International Geosphere-Biosphere Program was formed in March 1984. Its activities are funded by NASA, DOE, NOAA, USN, and USGS. In September 1984, the Committee met in Ottawa and participated in the ICSU General Assembly and Global Change Symposium. The General Assembly resolved to establish an ad hoc planning group on global change and requested that the ad hoc group report its findings and recommendations to the Twenty-first General Assembly meeting in 1986. During the sixth meeting held April 14-15, 1985, the Committee evaluated the reviews of their preliminary report, Global Change in the Geosphere-Biosphere: Goals for International Action.
2. An eight-member Panel to examine the impact of new technology on the collection and modeling of meteorological data was formed in February 1985. The Panel is working under the auspices of the Committee on Science, Engineering, and Public Policy (COSEPUP), a joint Committee of the three Academies, and with sponsorship from OSTP and NSF. A preliminary copy of the Panel's report was completed in early March 1985. In late April, COSEPUP will review written and oral briefings delivered by the Panel. Briefings at OSTP, NSF, and other interested agencies are scheduled for June 1985.

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